THE AMERICAN
JOURNAL OF PHARMACY.

MARCH, 1890.

BACTERIAL POISONING THROUGH MEDICINES.

By H. P. Campbell, Ph. G.

Many cases of poisoning have been traced to tainted meat, spoiled ice cream, and various other articles of food in which putrefactive decomposition had commenced, but there appear to be none directly traced to medicines. When we stop to think of the universal distribution of micro-organisms, and of the many drugs and solutions of drugs furnishing them with favorable conditions for growth, we can see that in all probability many such cases must have occurred. Bacteriology is such a comparatively new study that many of its details have not as yet been learned, and while the physician might look for disease germs in the system of the patient, he would not be apt to extend that care to the medicine. If the drug did not produce the usual effect, he would be far more apt to attribute it to an idiosyncracy on the patient's part, or to the disease having taken an unusual course, rather than to foreign bodies in the medicine. It was a long time before it was understood how commonly contagious diseases were spread by the bacteria finding their way into the water supply, and in future, doubtless, many things will be found dangerous in this respect which now pass unsuspected. That these organisms may find lodgments even in mixtures that are usually considered antiseptic in their action was very forcibly called to my attention by the following case, which caused some trouble and anxiety to all parties concerned.

The mixture ordered was quinine and whiskey, and was kept by the purchaser nearly a month before having occasion to use it. When the medicine was finally taken it made the patient very sick,

and the symptoms so much resembled those caused by an irritant poison, that the physician who had been called in pronounced it a case of poisoning. The patient was finally brought around all right, but the druggist was charged with having made a mistake, and dispensed some poison in place of the quinine. He however, was positive that the mixture had been dispensed as ordered and that he was not responsible for the patient's sickness. To determine if possible the cause of the trouble the remainder of the mixture was forwarded to me, with the request to give it a thorough examination.

The fluid presented the usual appearance of whiskey and on diluting with water showed the characteristic fluoresence of quinine. After evaporating the alcohol the solution gave a deep green color (thalleioquin) with chlorine water and ammonia. This was sufficient to prove the presence of quinine, and to show at least that nothing had been substituted for it. However, in the bottom of the bottle there appeared a dark, slimy-looking sediment, which failed to dissolve on shaking. This showed that something must be wrong as of course quinine should be freely soluble in a menstruum containing so large a percentage of alcohol as whiskey does.

On removing some of this sediment and examining under the microscope, it was found to consist almost entirely of micro-organisms, with a few particles of woody matter which had served as nuclei for the formation of many of the colonies. Like crystals, these growths prefer small points to start from, not liking to begin operation on a smooth surface. Wherever a piece of woody matter appeared in the liquid, it furnished the foundation for a large community of these bacteria, much larger than those without the nuclei. The other colonies being formed later, did not have time to attain as large a size as the first ones. As they were all dead when received, it was impossible to estimate their number by the usual method of cultivating on plates in gelatin, so the following method was used. The liquid was shaken up first, then one minim placed on the slide of the microscope, and the groups counted on a fraction of the field. This gave one hundred groups, and only allowing the small number of one hundred individuals to each colony, it would make 10,000 in every minim, or 150,000 to each cubic centimeter. Of course this is only approximate, and the method is not recommended for strictly accurate work, but the result was purposely placed at the lowest rather than the highest possible figure. Even at this rate a table-

spoonful dose would contain about 2,500,000 of these micro-organisms. It certainly is not a delightful thought for believers in "Rock and Rye" that their next dose may bring with it an invading army equal to that of any first-class European power, and perhaps as destructive.

The bodies present in this case would be classed as Micrococci, being small, rounded cells, requiring a magnification of about 600 diameters to render them distinct. They were collected in quite large, irregular groups, having grown by division in different directions, and not in one line, as those do that form chains. They very much resembled the section of an irregular piece of honey-comb, except that the cells are more variable in outline. The liquid appeared almost entirely free from other classes of organisms, or at least the microscope showed very few differing from these morphologically. Unfortunately, as has already been stated, it was impossible to attempt any culture experiments. Still the physiological effect on the patient was so decided that corroborative evidence was scarcely needed on that point.

A fresh mixture compounded of the same drugs as those used before, but dispensed in another bottle, produced no such effects. This disposes of the objection that an idiosyncracy of the patient in regard to quinine caused the trouble; and since chemical analysis of the liquid failed to show any foreign bodies except bacteria, to them we must refer the cause of the sickness.

How it was that the liquid became so filled with these growths is difficult to say. If it had been an aqueous solution of almost any other alkaloid it would not have been at all unusual to have found a flourishing colony of micro-organisms in it; but that an alcoholic solution of quinine should have developed them is certainly surprising. That quinine has a retarding action on fermentation[1] has been proved by Liebig, but Calvert[2] claims that the action is limited to certain classes of germs, and states that this effect is not produced on all. The commonly received theory of the therapeutic action of quinine is that it is fatal to the miasma germ, which flourishes in low swampy places where the disease is so prevalent. While the truth of this may still be questionable, it is certainly a fact that aqueous solutions of quinine and cincho-

[1] *Liebig Ann. Chem. Pharm.*, cliii, p. 152.
[2] *Proc. Roy. Soc.*, xx, p. 197.

nine are remarkably stable, and I cannot now recollect having seen one become infected, although always, even in warm weather, keeping a large quantity on hand ready for dispensing. Of course, it is necessary to use some sulphuric or other acid in dissolving it, which might have some effect in checking these growths. Yet the quantify necessary to use is so small, that the alkaloids themselves must have at least a retarding effect.

The antiseptic action of alcohol is too well known to be even questioned, and the sp. gr. in the case (making allowance for the dissolved quinine) showed that it was up to the U. S. P. requirements of over 44 per cent. alcohol. This very nearly corresponds to the official diluted alcohol, which has always been considered amply sufficient to protect solutions from bacteria. This is shown by the fact that 36 of the 79 fluid extracts in the Pharmacopœia are made from dilute or even weaker alcohol, also 36 out of 73 tinctures are likewise made from dilute alcohol. The reason why the organisms grew under conditions fatal to most germs is undoubtedly their greater vitality, at least in reference to alcohol. When antiseptics were first introduced there was little idea of the vast difference between classes of germs, and it was taken for granted that a substance fatal to one was fatal to all. It was soon found that antiseptics were not always effectual, and on this account much discredit was undeservedly thrown on the whole theory. As the subject was more thoroughly studied, it was found that one class would thrive under conditions fatal to another class, and that disinfectants immediately fatal to some germs had no effect whatever on others.

Thus alcohol is inhibitory to nearly all of these growths; but that some can flourish in it is already well known, any vinegar factory furnishing an instance. In making vinegar the sugar is first converted into alcohol, and then the latter is further oxidized by the influence of bacteria (Mycroderma aceti) into acetic acid. Now, if these germs could not survive in an alcoholic liquid, it is evident that this latter reaction could not occur, and the alcohol would remain unchanged. Further light on this subject is furnished by Dr. Le Bon,[1] in a paper read before the French Academy in 1883. He states that, while alcohol is a strong preventive, yet after these

[1] *Drug. Circ.*, xxvii, p. 140.

germs have once begun to grow, it acts feebly both in checking their growth and causing their death. Thus if the bottle had contained some colonies before the medicine was put in they might have increased until finally overcome by the alcohol.

If this was the way the trouble originated, it furnishes a good example of probably the most prolific source of infection that druggists have to deal with, viz: dirty bottles. When a prescription has been partly used by the patient, the sides of the bottle usually present the very conditions under which bacteria thrive best. The glass is covered with a layer of damp organic matter, and if placed on the mantel, which seems to be the most convenient place for many people, is kept warm by the heat of the stove, thus adding the only thing needed to make it a veritable paradise for these organisms. Thus tenanted, the bottle is returned to have the prescription renewed, supplying them with fresh food for their growth. Some stores have already adopted a custom which disposes of this danger, and is worthy of more general adoption, that of giving a new bottle every time the prescription is renewed. While causing some extra work, it is certainly preferable to simply rinsing the bottle out, as enough spores are nearly always left to seed a new crop. The same is true of attempting to remedy stock solutions that have become infected, by simply filtering and washing out the bottles. The ordinary filter is absolutely useless, as the spores or seeds are so minute that they will pass through the interstices, and start a new growth in the solution. The primary fault in making these solutions is that the water used contains a few germs to start with, and if the substance dissolved is not antagonistic to their life they very rapidly increase. This is likewise true of distilled water as ordinarily collected, and it has been suggested that a better method would be to boil the water for half an hour and then keep it protected from the air. This appears at once the simplest and yet the most effectual method of getting rid of these growths. Few bacteria are now known capable of living under such treatment, and the water, if immediately placed in full bottles, keeps very well. Water thus prepared is especially useful for hypodermic solutions. It is well known that the inflammation so frequently set up in this form of medication is due to the bacteria introduced at the same time. This is usually counteracted by adding some antiseptic to the solution, but the wisdom of this is questionable, to say the least. Most

European countries now forbid the use of such chemicals as salicylic acid and borax for the preservation of food, and any method which will do away with their use is certainly a step in the right direction.

Not to unnecessarily prolong this article, the following list comprises most of the substances in a pharmacist's stock that are liable to infection. In some, of course, the danger is small, but they are added for the sake of completeness. Water used in making solutions, including distilled; all aromatic waters, aqueous mixtures and chemical solutions (not antiseptic), including dilute acids; decoctions, infusions, vinegars, mucilages and plant juices; syrups and confections; lard, oils and emulsions; elixirs and wines; fluid extracts and tinctures made from dilute or weaker alcohol; solid extracts, all damp drugs, and drugs from the animal kingdom like pepsin, ox-gall, etc.

NEW YORK DISPENSARY,
February, 1890.

NOTE ON PURE ATROPINE SULPHATE.

BY J. B. NAGELVOORT.

There is no necessity to repeat what science owes to Schmidt, Ladenburg and Will on atropine, hyoscyamine and hyoscine. Their labors are known and appreciated.

I desire only to record an observation about the situation of to-day. Presuming that the distinction made in the price currents of chemical manufacturers in speaking of *heavy* sulphate of atropine (the condensation product of hyoscyamine), or in mentioning a contradictory melting point (115° C.), or in quoting *atropinum purum* and *atropinum naturale*, will not be understood by many. The pharmacist would be saved a good deal of annoyance if the revised U. S. Pharmacopœia, in its description of the properties of atropine sulphate and pure atropine, would not repeat the accuracy of the edition of 1882, that these compounds must answer satisfactorily to properties, distinctly different from those of hyoscyamine. Eminent ophthalmological authorities have observed that the effect of both alkaloids on the healthy and on the diseased eye is equal. The samples of atropine sulphate, on which my observations are based, were derived from two different manufacturers of

high standing. Both samples melted at 188° C. I had taken the precaution of subjecting each one to Vitali's test. They were lævogyre. (Atropine is optically inactive.) Their gold double salt had a melting point of 150° C., and was in brilliant, golden colored scales, procured in the usual analytical way. They did not have the form of the salt reproduced by Wormley (Microchemistry of Poisons, Plate xiii, Fig 2); but I may state that broken glass has macroscopically about the same appearance as the gold double salts of the two samples of atropine sulphate had under a magnifying power of 100 diameters.

This experience is in accord with the observations of others, and leads to the conclusion that the atropine sulphate used in our drug stores at the present time is in reality hyoscyamine sulphate.

COLORIMETRIC METHOD FOR ESTIMATING TANNIN IN BARKS, ETC.

By Samuel J. Hinsdale, Fayetteville, N. C.

Read at the Pharmaceutical Meeting, February 18.

Dissolve 0.04 gram potassic ferricyanide in 500 cc. water, and add to it 1.5 cc. (about 22 drops) liquor ferri chloridi. Call this *Iron Mixture.*

Dissolve 0.04 gram "pure" tannin (gallotannic acid), which has been dried at 212° F., in 500 cc. of water. Call this *Tannin Solution.*

Exhaust 0.8 gram oak bark with boiling water, and make it up to 500 cc. with cold water.

Place six 2 ounce clear glass tumblers (or Beaker glasses) on a white surface, and in one of them, *with a dropping pipette* (about four inches long and one-quarter inch wide) *about half filled*, put *five drops* of the infusion of bark, and in the others, *with the same pipette* (after rinsing), put 4, 5, 6, 7 and 8 drops of the "tannin solution." (The drops of the infusion and of the tannin solution must be uniform. The use of the same pipette, about half filled, *insures that.*)

Now, add to each 5 cc. of "iron mixture," and in about one minute add to each tumbler about 20 cc. water, and *within three minutes* observe the shades of color. The number of drops of "tannin solution" used in the tumbler which corresponds in shade of color

to the tumbler containing the infusion of bark, *indicates the percentage of tannin in the bark*, i. e., if it is the one in which seven drops were placed, the tannin strength of the bark is *seven per cent.*

It is best to observe the shades of color horizontally, rather than vertically, and to hold up the infusion tumbler, with the one which most nearly corresponds, opposite to a white wall, with your back to the light.

The above is written for *oak bark*, but the same process will answer for any substance containing less than ten per cent. of tannin. The results are necessarily in terms for commercial gallotannic acid, and not in those of pure tannin or of the particular tannin in the material assayed.

For substances containing between about 10 and 20 per cent., it is best to dilute the infusion with an equal part of water and proceed as above, using *five drops* of the *dilute* infusion, and for the answer, *double the result.* Thus, if the *diluted* infusion of tea required eight drops "tannin solution" to correspond, call the percentage *sixteen.*

For substances containing less than one or one and a-half per cent., exhaust *8 grams* instead of *0·8 gram*, and take *one-tenth* of the result for the answer. For substances containing more than twenty per cent., as galls, sumach, catechu, etc., you may dilute the infusion with two, three or more times its bulk with water, and calculate as above (as with tea), or you may use 1, 2, 3 or 4 drops of the undiluted infusion in the first glass and make the calculation thus, i. e.: As the number of drops of infusion used is to the number of drops "tannin solution" used (to correspond), so is 5 to the answer—thus, suppose *two* drops infusion were used and the corresponding tumbler contained *fifteen* drops tannin solution—2 : 15 : : 5, answer 37·5 per cent.

The object in diluting the infusions is because the infusion glass may be of too deep a blue shade It is better that it should just produce a *light blue.*

The tumblers must be perfectly clear and clean.

The "iron mixture," "tannin solution" and infusion must be freshly prepared and not exposed to the rays of the sun.

The water used must be free of iron and tannin.

SOME PLANT CONSTITUENTS.

ABSTRACTS FROM THESES.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy—No. 68.

Wm. J. Enders has analyzed the fruit of *Apium graveolens* and found that petroleum ether extracted 18·67 per cent., of which 16·48 per cent. dissolved in absolute alcohol, 1·72 per cent. remained undissolved and 0·54 per cent. volatilized at 110° C. and represented the volatile oil. The portion soluble in absolute alcohol was a dark reddish brown oily liquid of a penetrating odor and a strong taste, though not resembling the odor or taste of the drug. This according to some writers consists largely of oil.

Stronger ether extracted from the residual drug 1·73 per cent. of a dark brown resinous substance with a strong aromatic odor.

A crystalline glucoside was separated from the remainder of the drug by exhausting with absolute alcohol, recovering the alcohol, dissolving the residue in water and agitating with chloroform. This substance gave the reactions of a glucoside and gave off a strong odor when boiled with dilute acid. It was not further examined, since the amount from 50 grams of the drug was small.

Harry Vin Arny examined *Parthenium Hysterophorus* which is found in waste places in the West Indies, Northern Patagonia and Southern United States, especially in Florida and Louisiana. It is characterized by its extreme bitterness due, as shown by the investigator, to a glucoside which was extracted from the drug by alcohol, the alcohol recovered and the residue dissolved in water. This aqueous solution yielded the glucoside to chloroform by agitation with that liquid, from which it separated as a brown amorphous mass.

The author concludes that this glucoside is so-called *parthenine* (see Proc. Am. Pharm. Association for 1885 and 1886) which was originally supposed to be an alkaloid. The drug is much esteemed in the West Indies where it is used in place of quinine.

Harry C. Haak found a crystalline principle in the petroleum ether extract of *Azalea viscosa*. The residual extract after recovering the petroleum ether was dissolved in absolute alcohol boiling hot, and this solvent deposited crystals on cooling. The crystals were purified by re-solution in absolute alcohol and treatment with animal charcoal.

Edward S. Smythe obtained the odorous principle of *Gnaphalium polycephalum* (life everlasting) by distilling the drug with water. This substance of semi-solid consistence was diffused through the aqueous distillate from which it was removed by agitation with ether. It was of a light green color and possessed the peculiar odor of the drug to a considerable degree. The drug was found to contain 7·9 per cent. of moisture and 5·7 per cent. of ash. Extraction with the usual solvents failed to yield any unusual plant constituents.

Charles B. McKeel extracted a quantity of the fixed oil from *sunflower fruit.* This oil when pure is almost free from odor and is said to be used for culinary purposes.

The oil was found to exist in the fruit to the extent of 27·06 per cent., and was obtained by extraction with petroleum ether. On the large scale a gallon of oil is obtained from a bushel of the seeds.

As ordinarily extracted the oil has a light yellow color and a slight nut-like odor and taste. It is soluble in ether and chloroform, but insoluble in alcohol, and is easily saponified but is non-drying in exposure to air.

PHARMACOGNOSTICAL NOTES.

Abstracts from Theses.

Croton Oil—Wm. C. Zinnel, Ph.G., determined the amount of oil present in commercial croton seeds. The seeds were beaten to a paste, exhausted by successive portions of the solvent, and the latter then evaporated or distilled. Using for each experiment 100 gm. of seed, the amount of oil obtained was as follows: with benzin, 33·321 gm.; with chloroform, 22·9 gm., and with carbon disulphide, 33·7 gm. The two last oils were darker in color and more viscous than the first; that obtained by benzin was pale straw-yellow and had the spec. grav. ·943. The cause of the small yield with chloroform was not ascertained. The seeds (100 gm.), deprived of the testa, which constituted 29·67 per cent. of the entire weight, gave with benzin 21·8 gm. of oil; no cause is assigned for the deficiency as compared with previous experiments. The testa yielded 1·65 per cent. of oil.

Burdock Fruit.—Thos. Donaldson, Ph.G., found the fruit to contain 7·25 per cent. of moisture and to yield 6·66 per cent. of ash.

Petroleumbenzin extracted 8·6 per cent. of yellow fixed oil, and about 1 per cent. of whitish waxy matter, the latter being insoluble in ether. The alcohol extract amounted to 15·9 per cent., partly soluble in water; the aqueous solution, when concentrated, yielded to chloroform the bitter principle in an amorphous condition. The figures obtained differ somewhat from those reported in a paper published in AMER. JOUR. PHAR., 1885, p. 127.

Amount of Alkaloid in Tea.—John Hamilton Small, Ph.G., whose thesis is accompanied by specimens of the leaves and of a flowering branch of the tea plant, grown in Greenville, S. C., has gathered some information regarding tea culture in the United States, which is believed will play, in the future, an important part in the agricultural interests of this country. The greatest obstacle seems to be the cost of labor to properly pick the leaves and to prepare them for the market. The tea plant will endure a much lower temperature than is generally supposed; but the sudden changes of our climate prevent it from being grown north of Maryland, while farther south it thrives quite well.

Eight commercial samples of tea were examined with the following results, the alkaloid being estimated by the process of Paul and Cownley (see AMER. JOUR. PHAR., 1887, p. 628):

Commercial Name.	Color.	Theine.
Japan, uncolored,	greenish black,	1.79 per cent.
Japan, colored,	bluish green,	2·30 "
India, fine white top,	black,	3·54 "
Foochow,	black,	3·40 "
Young Hyson,	bluish green,	3·26 "
Congo,	black,	3·52 "
Chinese imperial,	bluish green,	2·85 "
Formosa,	black,	2·38 "

Japanese Aconite.—Eugene George Reig, Ph.G., prepared from this drug a tincture and a fluid extract, following the formulas of the U. S. Pharmacopœia for the corresponding aconite preparations. Both were lighter in color than the officinal ones. On evaporating 10 gm. of each the tincture yielded 200 mgm., and the fluid extract 620 mgm. of extract. The alkaloids were determined by evaporation, taking up with water, removing coloring matter by ether, rendering alkaline by sodium carbonate, and extracting the alkaloids by ether. 50 gm. of the tincture, representing 20 gm. of root, yielded 67 mgm. of alkaloids. 40 ccm. of the fluid extract (= 40 gm. of the

root) gave 145 mgm. of alkaloids. The Japanese aconite used, therefore, contained 0·35 per cent. of alkaloids.

White Snakeroot.—A drug known as white snakeroot is to some extent used in a proprietary medicine in a Western city. Chas. H. Blouch, Ph.G., ascertained from a Southern dealer in crude drugs, that it is the rhizome with rootlets of *Eupatorium aromaticum*. On distilling 5½ lbs. of the drug with water, about 25 grains of volatile oil were obtained having a strong odor and a pungent taste. The drug exhausted by cold water, yielded with boiling water a solution which was precipitated by alcohol, and this precipitate behaved like inulin in being colored yellow by solution of iodine, and when boiled with diluted acid, in being converted into a sugar reducing Fehling's solution. A tincture was prepared with diluted alcohol, and a fluid extract with a mixture of two parts of alcohol and one part of water; on standing a few days both preparations deposited sediments which, however, have not been examined.

Podophyllum.—Clifford G. Dunn, Ph.G., states that the most active constituents of the resin are contained in the first portion of the alcoholic percolate, while the later percolates yield a resin which differs very much from the former in activity. Podophyllotoxin may be prepared by macerating one ounce of the resin in 4 fluid ounces of chloroform free from alcohol, filtering, and adding the filtrate to 16 parts of benzin. It forms a light yellowish white powder, the chloroformic solution of which should remain clear on the addition of ether, but deposit white flocks when mixed with petroleum spirit.

ON COLLENCHYMATIC CORK.[1]

By Hans Molisch.

Directly beneath the external epidermis of the fruit of numerous varieties of *capsicum* is found a tissue of several tiers which, from its appearance, must be, and thus far has been, regarded as collenchymatic parenchyma. T. F. Hanausek (*Nahrungs- und Genussmittel*, p. 312) describes it as follows: "Beneath the epidermis is a parenchyma, the cells of which are tangentially much elongated in the first and second rows, appear rectangular in the third and fourth

[1] Translated from *Berichte der Deutschen Botanischen Gesellschaft*, 1889, p. 364.—J. M. M.

(last) rows, viewed from above are polygonal, measure about 0 035 mm., and are thickened in such a manner that the tissue must be designated as collenchyma layer." This tissue is also described as collenchyme by J. Moeller (*Mikroskopie der Nahrungsmittel*, p. 245) who, however, states that its membranes do not give the reaction for cellulose.

Having for some time studied the histochemistry of capsicum fruit, the behavior of this tissue attracted particular attention inasmuch as, notwithstanding the collenchymatic character of the cells, all reagents for cellulose gave negative results.

The histology of the pericarp of capsicum may be briefly sketched as follows: A transverse section of a large fruit shows first an epidermis composed of thick-walled cells, followed by the collenchymatic parenchyma mentioned above, in about four to seven tiers, the thickened cell walls of which do not give the cellulose reaction; then follows a large-celled thin-walled parenchyma having a somewhat collenchymatic appearance and acquiring a fine violet color with iodine zinc chloride (Chlorzinkjod). The succeeding layer is made up of very large, somewhat viaduct-like cells which are completely collapsed in the dried pericarp, and are covered by the inner derma; the latter being composed of thin-walled non-lignified and of isolated thick-walled lignified cells. Conforming to the great variability of the genus, the structure is subject to considerable variations, more particularly in regard to the quantitative development of the several layers; for instance, the collenchymatic tissue may be reduced to a single cell-layer, and in the small-fruited Cayenne pepper is even entirely wanting.

The cell-walls of the "collenchyme" appear under the microscope colorless or yellowish, and by iodine zinc chloride become dark yellow or deep brown, the entire layer thus becoming sharply distinct from the cellulose-parenchyma beneath. After prolonged action of the reagent the innermost very thin layer of the cell wall is colored violet, while the remaining thickening layers retain the brown color. The cell walls at the border of the thick-walled and thin-walled cells have a thicker cellulose film, and in their middle layers enclose small granules (suberin) which give to the cell wall a granular appearance. Treatment with iodine and sulphuric acid does, likewise, not result in blue coloration.

These cell-walls are also entirely destitute of lignification, since

they do not give the color reactions with Wiesner's reagents, with metadiamido-benzol, or with thymol-hydrochloric acid.

Concentrated potassa solution colors the cell-walls deeper yellow, particularly after warming; if under the cover glass the heating be continued to boiling, numerous yellow granules and globular masses issue from the cell walls in the manner which is characteristic for cork-tissues, according to the researches of von Hoehnel (1877); at the same time the stratification of the cell-walls becomes about parallel with the surface of the pericarp. The addition of water causes the granules to disappear and the stratification to become indistinct. The cell-walls of the tissue in question, on being treated with Schulze's mixture, show the peculiar cerinic acid reaction, and on treatment with concentrated chromic acid, have the precise behavior of suberized membranes.

From these reactions it becomes evident that this tissue is cork collenchymatically developed. Such a tissue combining the most important characteristics of collenchyme and cork, has thus far been unknown. I call it *collenchymatic cork;* but it might also be properly named *suberized collenchyme.* Its appearance, the manner of thickening and the contents, correspond with parenchymatic collenchyme. For the cells, until their period of death, contain living plasma, nucleus, oil and red coloring matter becoming blue with concentrated sulphuric acid. But they differ from typical collenchyme in not directly giving the cellulose reaction. They further resemble collenchyme in not having the radial arrangement characteristic for cork cells.

It will be seen that this peculiar tissue of the capsicum fruit unites the characters of the two typical tissues, cork and collenchyme, intermediate forms of which were heretofore unknown; and it evidently serves also the designs of both in adding to the firmness of the pericarp and in aiding the functions of the epidermis.

The berries of other solanaceæ, like *Atropa Belladonna, Solanum nigrum* and *Solanum Lycopersicum* do not contain collenchymatic cork. This, however, was found in *Solanum melongena* var. *coccinea,* where it is two to four cell-tiers thick, has a golden-yellow color, is decidedly collenchymatic and, like the epidermal cells, suberized in a high degree. The yellow coloring matter of the cell membrane, on being treated with concentrated sulphuric acid, acquires a deep orange red color.

CHEMICAL NOTES.

By Henry C. C. Maisch, Ph.G., Ph.D.

Oil of Rosemary.—R. A. Cripps (*Pharm. Jour. and Trans. Nov. 23, 1889* p. 405) examined four samples of this oil, and found two adulterated with petroleum and two with alcohol. The adulteration in the first two oils was found by heating on a waterbath until the odor had completely disappeared. The solubility of the oils in alcohol of 0·838 sp. gr. was 1 in 20 resp. 30 parts, pure oil dissolving in 5 pts. of alcohol. The solutions were of a yellow color, one showing fluorescence. The oils adulterated with alcohol were colored by magenta and were soluble in 4½ resp. 3½ pts. alcohol of the above specific gravity.

Seeds of Euphorbia Lathyris.—R. Tawara reported to the Chemical Society of Tokio (*Chem. Zeit.*, 1889, p. 1706) on a chemical investigation of the Chinese drug sokusuischi (seeds of E. Lathyris). The author found besides the oil, noticed by O. Zander, two crystalline principles, one of which proved to be identical with æsculetin. The second body was not further examined on account of scarcity of material, it being present in the seeds to the amount of 0·024 per cent. Æsculin does not seem to be present.

Two new Sugars from Quebracho.—C. Tanret (*Comp. rend.*, 1889, cix, p. 908) mixed coarsely powdered quebracho bark (Aspidosperma Quebracho) with milk of lime and extracted the same with 50° alcohol. The liquid is evaporated to ½ liter for every kilo of the bark used, neutralized with acetic acid and treated with basic acetate of lead. The sugar is precipitated from the filtrate with ammoniacal lead acetate, well washed and decomposed with dilute sulphuric acid. This solution is evaporated to a syrupy consistency, dissolved in alcohol of 90 per cent. to saturation, precipitated with ether and further purified. The sugar, quebrachit, has the composition $C_7H_{14}O_6$, sp. gr. 1·54 at 0° C., melts at 186°–187° C., boils in vacuo at 210° C. subliming in needles, is lævogyre $\alpha\,[_D] = -80°$, does not reduce Fehling's test, reduces ammoniacal silver nitrate on boiling and does not undergo fermentation with yeast. Quebrachit heated with hydriodic acid yields a lævogyre inosit $C_6H_{12}O_6$, an aromatic compound, melting at 238° C., boiling in vacuo at 250°; rotation $\alpha\,[_D] = -55°$.

Frangulin.—Prof. T. E. Thorpe and H. H. Robinson (*Chem. Society*, Dec. 19, 1889) use the following method for preparing the

glucoside frangulin. The bark of Rhamnus Frangula is treated with low boiling petroleum ether to remove fat, and then with alcohol, which dissolves the glucoside, resin, etc. This extract is treated with lead acetate to precipitate tannin, and the liquid is freed of lead by means of sulphuretted hydrogen. Fourteen pounds of bark yielded 5½ gm. frangulin. Composition of the glucoside dried to constant weight at 120° C. is $C_{22}H_{22}O_9$. The sugar obtainedfrom frangulin is not glucose. The other decomposition product, insoluble and of a yellow color, dried at 120° C., has the composition $C_{15}H_{10}O_5$, and is identical with emodin from rhubarb.

A delicate test for copper.—Dr. H. Thoms (*Pharm. Centralh.*, 1890, p. 32) noticed that potassium iodide was dissolved in a sample of distilled water with a yellow color. Investigating the cause thereof, he found it due to traces of copper which could not be detected by potassium ferro-cyanide. This peculiar behavior is due to the following: As copper does not form a cupric iodide when a cupric salt and potassium iodide are mixed, the copper is reduced to the cuprous state and iodine is liberated. The latter could still be detected by means of starch solutions when a solution of cupric sulphate 1 to 500,000 was treated as above.

Percentage of iodine in Fucus vesiculosus and Chondrus crispus. L. Van Itallie (*Arch. d. Pharm.*, 1889, 1132) obtained reactions for iodine by means of Prof. F. A. Flückiger's method (*Archiv*, 1887, 519) with 10 gm. ch. crispus and 3 gm. fuc. vesiculosus. For quantitative estimation, the latter alga was treated as follows: 50 gm. of the powdered plant were macerated for eight days with 40 per cent. alcohol, strained and washed with alcohol until colorless. The liquid was neutralized with sodium carbonate, evaporated to syrupy consistency, absolute alcohol added and the precipitate washed with alcohol. The filtrate was evaporated, residue dissolved in water, treated in a separating funnel with dilute sulphuric acid containing nitrous acid, and the iodine taken up with chloroform. The solution was washed a number of times with water to remove the nitrous acid and the iodine titrated with $\frac{1}{100}$ sodium thiosulphate solution. The author found 0·01078 per cent. iodine.

Chloral for Dandruff.—The *Clinical Reporter* states that a solution of 5 grains of chloral in an ounce of water will clear the hair of dandruff and prevent its falling out from that cause.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Aristol or diodo-dithymol $C_{20}H_{24}O_2I_2$ is made by the action of a solution of iodine in potassium iodide upon a solution of thymol in sodium hydrate. It forms a brown-red amorphous powder containing 45·80 per cent. iodine, and is insoluble in water and glycerin, but easily soluble in ether and fixed oils; the solutions must be made without heating, as heat and also light bring about decomposition. It is inodorous and is especially valuable in the treatment of psoriasis and lupus.—Dr. F. Goldmann, *Apoth. Ztg.*, 1890, 45.

Chloral hydrate and *Antipyrine* triturated together liquefy; from the liquid, after some time, separate white crystals, which, examined by L. Reuter, were found to be an additional product of the two molecules or trichloraldehyd-phenyldimethylpyrazolon. The compound was found to be therapeutically inactive.—*Apoth. Ztg.*, 1890, 45.

Naphthalin-camphor packages in place of naphthalin paper are recommended by L. Keutmann to be made by melting together four parts naphthalin and one part camphor and pouring into pasteboard or metal boxes. They are used by fastening them to the upper part of a wardrobe or trunk, and the evaporation of the mixture can be regulated by opening the lid of the box. The camphor very nicely conceals the odor of the naphthalin. In the same way a disinfectant may be made and used, but substituting carbolic acid for the camphor; in this case it is best to impart a red color by the addition of a little alkali.—*Pharm. Centralhalle*, 1890, 17.

A delicate test for copper is based upon the liberation of iodine when potassium iodide is added to a solution of a cupric salt; in very dilute solutions the addition of starch paste is made to reveal the presence of the free iodine. The test is applicable to solutions not containing other substances which liberate iodine or which prevent its liberation; it is especially adapted to water analysis. Compared with other copper tests one part crystallized copper sulphate in 500,000 parts of water can be detected after the addition of a little starch paste; potassium ferrocyanide added to solutions (1 : 100,000) hardly shows any change, with solutions (1 : 10,000) a distinct red coloration is produced; ammonia is not applicable to solutions more dilute than 1 : 10,000, and in this dilution only a very faint blue coloration results.—Dr. H. Thoms, *Pharm. Centralhalle* 1890, 31.

Compressed drugs.—A Dresden firm has recently introduced a line of these drugs in which small quantities of the drugs sufficient to make a cupful of the infusion are wrapped up separately in tin-foil and these are put up in larger packages.—*Pharm. Centralhalle*, 1890, 32.

Chemically pure sulphate of quinine may be distinguished from the commercial sulphate and the sulphates of cinchonine, cinchonidine and quinidine by a solubility test in a mixture of chloroform and petroleum ether. 0·2 gram are briskly agitated with a mixture of 30 parts by volume of petroleum ether (sp. gr. 0·680) and 70 parts chloroform, filtering and adding 3 to 4 volumes of petroleum ether; in the absence of the other sulphates the solution will remain clear. An admixture of only 0·1 per cent. other sulphate will give rise to a precipitate or turbidity.—E. Hirschsohn, *Pharm. Ztschr. f. Russl.*, 1890, 1.

Exalgin may be distinguished by the following simple test from acetanilid and phenacetin: 1 gram is dissolved in 2 cc. chloroform (acetanilid requires 6 cc. and phenacetin 20 cc. chloroform) and 20 cc. petroleum ether (sp. gr. 0·650) added; the solution should remain clear. 10 per cent. phenacetin and 20 per cent acetanilid can be detected by the formation of a precipitate after standing a short time.—E. Hirschsohn, *Pharm. Ztschr. f. Russl.*, 1890, 17.

A test for hydrogen dioxide.—The solution to be tested is made alkaline and then a soluble neutral salt of lead or copper added; a deep brown red precipitate, rapidly changing to red and finally to white, indicates hydrogen peroxide; in concentrated solutions effervescence is also to be observed. Ozone solution (Lender's) does not give this test.—A. O. Gawalowski, *Rundschau*, 1890, 79.

Sulphurous acid as a product of the alcoholic fermentation was discovered in beer, and quite recently by Dr. B. Haas in wines. It is not a constant product but is formed by the reduction of sulphates, present in the wort or must if the fermentation proceeds very slowly; if the fermentation is a quick one, no sulphurous acid is produced. The SO_2 can be estimated by distilling the liquors in a current of CO_2, collecting the distillate in a solution of iodine and precipitating the sulphate formed with barium chloride.—*Ztschr. f. Nahrungsm. Unters.*, 1889, 241.

Eulyptol is a mixture containing salicylic acid 6 parts, carbolic acid 1 part and eucalyptus oil 1 part. The name should not

be mistaken for *eucalyptol*, the important constituent of oil of eucalyptus.—*Pharm. Ztg.*, 1890, 21.

An iodine ointment can be made by agitating powdered iodine with melted yellow vaseline; about 3 per cent. iodine will be dissolved and retained in solution upon cooling.—*D. Med. Ztg.*; *Pharm. Ztg.*, 1890, 22.

Hydrastis canadensis.—The ash of this drug has been found to contain aluminium oxide in quantity equal to 0·3 per cent. of the dry drug; the total ash amounts to 4·80 per cent.—Dr. R. Gaze, *Apoth. Ztg.*, 1890, 9.

Reduced iron may be volumetrically examined by the following method: One gram is placed in a 200 cc. cylinder or flask, dissolved in 40–50 cc. dilute sulphuric acid (1 : 5) and potassium permanganate solution added carefully until a permanent red color is produced; by the addition of a dilute sugar solution the excess of permanganate is decomposed and the solution diluted with water to 200 cc. Of this solution 50 cc. (= 0·25 gm. of reduced iron) are placed in a flask, a solution of two grains of potassium iodide in water and a few cc. of hydrochloric acid added and the flask corked; after standing for one hour the liberated iodine is titrated with $\frac{n}{10}$ solution of sodium thiosulphate adding a little starch solution towards the end of the titration. The number of cc. thiosulphate required, multiplied by 0·0056 will give the amount of total iron (metallic iron and magnetic oxide of iron). The percentage of metallic iron may be obtained directly by multiplying the cc. of thiosulphate solution used by 8·12 and subtracting 262·5.—Dr. A. Partheil, *Apoth. Ztg.*, 1890, 55.

Lard adulteration with cotton-seed oil.—Prof. Dr. A. von Asboth in *Chemiker Ztg.*, 1890, 93, confirms the results of Muter and De Koningh's method of examining the above adulteration. This method is based upon the isolation of the fluid fatty acids and determining the iodine absorption of these acids. Three grams of the sample are saponified with alcoholic KOH and the neutralized solution (with acetic acid) is poured into a boiling mixture of 30 cc. 10 per cent. lead acetate solution and 200 cc. water, stirring constantly; the lead soap is thoroughly washed by decantation, and afterwards treated with 120 cc. of ether After standing 12 hours the mixture is filtered, the precipitate thoroughly washed with about 120 cc. of ether, sufficient dilute HCl (1 : 4) added to make 250 cc.

and the mixture well agitated, until the lead salt is decomposed, when the aqueous liquid is removed, the ethereal solution washed until free from acidity and then diluted to 200 cc. by addition of pure ether; 50 cc. of this solution are freed from ether, 50 cc. alcohol added and titrated with $\frac{n}{10}$ NaOH; 1 cc. NaOH = 0·282 gram oleic acid. To determine the iodine absorption a quantity of the ethereal solution equal to 0·5 gm. oleic acid is evaporated at 50° C. in a current of CO_2, and 50 cc. Hübl's reagent are added; after standing for 12 hours in the dark, 35 cc. of a 10 per cent. potassium iodide solution are added, the mixture diluted to 250 cc. with water, 15 cc. chloroform added and then titrated with $\frac{n}{10}$ sodium thiosulphate. At the same time 50 cc. Hübl's reagent must be titrated with the thiosulphate; the difference between the two titrations gives the iodine absorbed by the fluid fatty acid taken and by calculating to 100 grams of the fluid acid the iodine absorption is found.

Pure lard yields 54 per cent. of liquid acid, with an iodine absorption of 94. Pure cotton-seed oil gives approximately 70 per cent. of liquid acid with an iodine absorption of 136. The method of calculation is as follows, A representing the iodine absorption of the sample, and B the percentage of oleic acid found:

$$\frac{A - 94}{42} \times \frac{B}{70} = \text{percentage of adulteration.}$$

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

SOLUBLE SACCHARATE OF IRON.—Athenstædt's process is given as follows in the *Moniteur Scientifique*, Nov., 1889: A 1 to 100 solution of a ferric salt is precipitated by an equally strong solution of ammonia or a fixed alkali, taking care to operate at a tempera- of about 10° C., and, in all cases, below 15° C. The precipitate must be washed rapidly in the dark and with distilled water having a temperature between 10° and 15° C. The ferric hydrate is then mixed with powdered sugar in a quantity so regulated that the dry preparation will contain 3 parts of metallic iron to 100 parts of sugar. The mixture of hydrated iron and sugar is maintained at the boiling point until the iron becomes dissolved in the syrup. The dry product is obtained by drying *in vacuo* at a low temperature. This saccharate of iron may be kept in a solution

made by diluting the mixture, when cold, with water. These solutions are clear, and remain so indefinitely.

SALICYLATE OF ESERINE.—The sulphate of eserine being deliquescent and difficult to weigh, M. Petit proposes (*J. de Ph. et de Ch.*, Dec.) to substitute for it the salicylate of eserine, which crystallizes well, is neutral and is easy to weigh; it remains unchanged for an indefinite period.

COCAINE AND IRON MIXTURE.—The formula of Dr. Luton's mixture is given as follows in the *Rev. de Clin. et de Thérap.:* Water, sweetened with saccharin, 1·25 gm.; liq. perchloride of iron, 2 gm.; hydrochlorate of cocaine, 25 cgm.; dose for adults, a tablespoonful every two hours. For infants, the amount of cocaine is reduced to 10 cgm., the dose being one dessertspoonful. With this, ice should be given internally. Dr. Luton says that the use of this mixture makes the tearing away of false membrane, cauterization, etc., unnecessary. He adds that he has not for a long time had in his practice a case of death from angina. He had previously claimed for cocaine the power of aborting variola and varioloid—if used in the beginning of the attacks.—*Répert. de Phar.*, Jan. 10.

PREPARATIONS OF SALOL.—At a meeting of the Paris Society of Pharmacy, Dec. 4, some preparations of salol were presented under the names of *salol-santal*, *salol-copaiba*, and *salol sweet almond oil.* The author of the communication stated that salol dissolved quite freely, not only in the above-named liquids, but also in oil of turpentine, the fixed oils and liquid paraffin.

PLASTIC PENCILS WITH SOAP.—A note by M. Garesnier (*Soc. de Phar. de Paris*, Dec. 4), describes the preparation of the *copper crayons* made after a formula given by Prof. Tarnier, as follows: Sulphate of copper, 1 gm.; white Marseilles soap, 30 gm. The copper salt was first pulverized in a warm mortar; then the soap (rasped) was added, together with 30 drops of glycerin and 10 drops of oil of ricinus. The mass was then heated in a water-bath until it became semi-fluid, when it was drawn by aspiration into glass tubes and allowed to cool, being first slightly compressed by means of a wire and a ball of cotton. After cooling the pencils were pushed out and wrapped in paper.

Crayons of creasote were made in the same manner after the following formula: Creasote, 1 part; soap, 4 parts. The author says

that crayons of iodide of potassium, phenic acid, etc., may be made in the same way.

SULPHURIC ACID OINTMENT.—M. P. Vigier learned that an ointment peddled by a charlatan was giving surprisingly good results in sciatica, swollen articulations of rheumatic origin, etc. Procuring some of the preparation, he analyzed it and found it to contain: Sulphuric acid, 1 part; lard, 7 parts. Vigier made up some of it for distribution. The reports were very favorable. It caused considerable redness but no blistering. The pain seems to have been relieved in all cases.[1]

ADMINISTRATION OF EXALGIN.—The formula used by Dr. Dujardin-Beaumetz is given in various journals, as follows: Exalgin, 2·50 gm.; tr. orange, 5 gm.; water, 120 gm.; syrup of orange-peel, 30 gm. A tablespoonful (containing 25 cgm. of exalgin) may be given morning and night. Desnos is said to have given 1·50 gm. of exalgin without causing disturbance. According to Dr. Dujardin-Beaumetz, this substance "is very active against the element of pain, whatever may be its origin, and is especially useful in essential or sympathetic neuralgia, tabetic pains and angina pectoris."

ADMINISTRATION OF CAFFEINE.—Tanret's formula is used by Dr. Misrachi in puerperal hemorrhage; it is thus given in the *Nouv. Arch. d'Obstet.*: Benzoate of sodium, 3 gm.; caffeine, 2·50 gm., distilled water, 6 gm., or q. s. to make 10 ccm. The solution is to be made with warm water; each ccm. contains 25 cgm. of caffeine. Sixty to eighty cgm. of caffeine injected hypodermically is said to arrest post-partum hemorrhage with great rapidity.

ESTIMATION OF URIC ACID.—Arthaud and Butte, in a communication to the French Biological Society, propose the following method, founded apon the property possessed by uric acid of forming an insoluble urate with copper. Their reagent is formulated as follows: Sulphate of copper, 1·484 gm.; hyposulphite of sodium, 20 gm.; tartrate of potassium and sodium, 40 gm.; distilled water, q. s. to make one litre of solution. Contact with the hyposulphite reduces the copper salt, and the excess of the former contributes to maintain the copper salt unchanged, and to give stability to the

[1] Jourdan's *Pharmacopée Universelle* (1828), I, p. 50, contains seven formulas for sulphuric acid ointment, which was used externally in chronic ophthalmia, psoriasis and paralysis, and internally in dropsy and jaundice.—Editor AM. JOUR. PHAR.

mixture. Experiment, say the authors, shows that 1·484 gm. of sulphate of copper is required to precipitate 1 gm. of uric acid, hence, 1 ccm. of the authors' mixture corresponds to 1 mgm. of uric acid. In using, the phosphates are precipitated from the urine by carbonate of sodium in excess. Of the filtered liquor 20 ccm. is taken, and into this the reagent is introduced, drop by drop, until precipitation and flocculence ceases. The authors say that this reagent is very sensitive.—*Répert. de Phar.*, Jan. 10.

THE DETERMINATION OF THE DIASTASIC POWER OF EXTRACT OF MALT.

By R. A. Cripps, F.I.C.

The above title indicates the scope of this brief note; it is not my intention to enter into the question of the value of extract of malt as a nutrient, but simply to record a fact of considerable importance in connection with the determination of its value as a digestive of starchy foods.

Considerable importance is attached to the estimation of this digestive power; it is therefore very strange that published results should show such extraordinary differences, *e. g.*, Messrs. Dunstan and Dimmock (who were, I believe, the first to introduce a ready method for making this determination) state that the best malt extracts of the market should completely digest *one-seventeenth* of their weight of starch in several (three?) hours (*Pharm. Journ.* [3], ix, p. 733). Carl Jungk, in a paper in the American Journal of Pharmacy, June, 1883, and *Pharm. Journ.*, xiv, p. 104, describes a method whereby the effect of malt extract upon starch mucilage is tested at intervals of one minute, and says that good extract of malt should convert *its own weight* of starch within ten minutes at 100° F. Later still, *Pharm. Journ.*, xv, p. 236, T. S. Dymond compares the two methods above referred to, and after condemning Jungk's method, states that a good malt extract should completely digest one-fifteenth of its weight of starch in half an hour at 140° F.

I think the key to these divergencies will be found in the experiments recorded below. It is evidently not in the fact that malt extract has improved during late years, for Mr. Dymond's experiments are of later date than those of Jungk. Nor do I think that the English-made extracts of malt are inferior to those of foreign

manufacture, as might be suggested by the low results of the English experimenters; on the contrary, from the experience of large numbers of determinations, I am strongly of opinion that (generally speaking) English extracts are distinctly superior to either American or German ones.

In the first place I will describe the method I am in the habit of using, for which I do not claim any originality, it being simply a modification of the foregoing processes:

(1) Prepare a mucilage by mixing 1 grm. of potato starch or arrow-root (dried in an oven at 212° F.) with 10 cc. of cold water, add 100 cc. of boiling water, and boil the whole for half an hour; allow to cool to about 100° F., and make up the measure to 100 cc.

(2) Dissolve 5 grms. of the sample of extract of malt in water sufficient to produce 50 cc. of solution.

(3) Dissolve ·1 grm. iodine in 100 cc. of water by the aid of ·2 grm. of iodide of potassium.

50 cc. of starch solution is introduced into a flask or bottle and kept in a water-bath at a temperature of 98° to 100° F. until it has attained that temperature, when 5 cc. of the malt solution is added (also at 98°–100° F.) gently shaken to mix thoroughly, and replaced in the water-bath; after five minutes and at intervals of five minutes (or less if found desirable) 4 cc. of the liquid is poured into a test-tube containing 1 cc. of the iodine solution. A good extract of malt will give no indication of starch or dextrin after ten, or at most, fifteen minutes, while one which still gives a distinct coloration after thirty minutes should be rejected as quite unfit for use;

	0·5 grm.				0·1 grm.			0·05 grm.			
	5 min.	15 min.	30 min.	45 min.	5 min.	15 min.	30 min.	5 min.	10 min.	15 min.	30 min.
Arrowroot,	Done	—	—	—	Done	—	—	Bht brn	Pale brown	Done*	—
Maize, . .	Bluish	Bluish	Done	—	Indigo	Indigo blue	Violet	—	—	—	Clear blue‡
Potato, . .	Done	—	—	—	Done	—	—	Bht brn	Pale brown	Done†	—
Rice, . . .	Bluish	Pale bl.	Done	—	Blue	Bluish	Pale vlt brown	—	—	—	Clear violet
Wheat, . .	Brownish Violet	Violet brown	Violet tint	Very pale violet	Brown-violet	Violet	Purple	—	—	—	Clear violet‡

* Completed in twelve minutes.

† Completed in twelve and a half minutes.

‡ These colors refer to the liquid five times diluted; the color was too deep to be seen before dilution.

that is, *extract of malt should completely digest its own weight of potato starch in 10–15 minutes at 98°–100° F.*

It will be remarked that I have selected potato starch or arrow-root for this test, other starches giving widely differing results. The accompanying table will indicate the importance of using one or other of these kinds of starch, and, as mentioned above, probably suggests an explanation of the widely differing results of other observers.

The different mucilages were all prepared as described above, and quantities of mucilage representing 05, ·1 and ·5 grm. of each starch (dried) introduced into the bottles, the bulk of each being made up to 50 cc. with distilled water, and ·5 grm. of extract of malt added to each.—*Phar. Jour. and Trans.*, Dec. 21, 1889, p 481

THE INFLUENCE OF ARTIFICIAL GASTRIC JUICE ON THE ACETOUS AND LACTIC ACID FERMENTATIONS.

By F. O. Cohn.

Of the views held concerning the origin of the hydrochloric acid in the gastric juice, one of the most generally accepted is that lactic acid formed from carbo-hydrates, liberates hydrochloric acid, by acting on sodium chloride (Ewald). At the same time, it is well known that acidity stops fermentative processes, and it is therefore important to determine accurately what influence gastric juice exerts on the acetic acid and lactic acid fermentations, and what concentration of hydrochloric acid stops the fermentation.

In the present research an artificial gastric juice was made with the *Pepsinum germanicum* of Witte of Rostock ; the micro-organisms of the acetic and of the lactic fermentations were grown in suitable saline media. This was titrated with normal sodium hydroxide solution before and after infection with the micro-organisms in question. The influence on the rate of fermentation of (1) pepsin, (2) hydrochloric acid, (3) pepsin and hydrochloric acid, and (4) hydrochloric acid in the presence of peptone, was investigated; some experiments were also made to determine the amount of decomposition of phosphates brought about by hydrochloric acid.

The results obtained were as follows:

(1) Pepsin does not hinder either the acetic or the lactic acid

[1] *Zeit. physiol. Chem.*, xiv, 75–105, *Jour. Chem. Soc.*, 1889, p. 1227.

fermentations, but it appears to be a good nitrogenous pabulum for the organisms.

(2) Even traces of hydrochloric acid hinder the acetic fermentation. The lactic fermentation is stopped by just so much hydrochloric acid as is necessary to change the phosphates (which are present in the nutritive liquid for the proper growth of the *Bacterium acidi lactici*) into chlorides. The fermentation was thus probably hindered by the hydrogen phosphate thus liberated.

(3) Pepsin and hydrochloric acid together act in the same way as hydrochloric acid alone, only not quite so powerfully.

(4) Hydrochloric acid in the presence of (probably combined with) peptone, does not hinder the fermentations at all. It is also useless in aiding the digestion of albumen by pepsin.

(5) The acetic acid fermentation is hindered by hydrochloric acid when sufficient has been added to liberate from 0·5 to 0·7 parts per thousand of hydrogen phosphate from the phosphates present.

OIL OF ROSEMARY.

By E. M. Holmes, F.L.S.,
Curator of the Museum of the Pharmaceutical Society.

During the present month two samples of essential oils, obtained from plants grown in Sussex, have been presented to the Museum. One is the oil of rosemary and the other that of lavender, both distilled at Brighton, from the plants grown there by Mr. Sawer (see vol. xv, p. 125). With these specimens some information is contributed concerning the details of the preparation of the oil of rosemary, which seems sufficiently interesting for publication.

Mr. Sawer states that he first experimented with plants raised from seeds, which had been collected probably in the south of France, but these yielded a rank oil. He then obtained cuttings from old gardens in England, and found that if planted in August, they strike rapidly, especially if pulled off with a "heel" or woody portion, and shaded from the sun. It was found that light loam answers best, and that the cuttings succeed best in wooden boxes. Mr. Sawer recognizes two distinct forms of rosemary, the one having a larger leaf, which is more hoary underneath than the other; both, however, seem equally fragrant, and he mixes them in equal proportions for distillation. Rosemary is by no means easy to grow

everywhere, requiring a warm, sheltered and somewhat dry situation. In a damp atmosphere, or where shaded by trees, or in a rich soil, it is apt to grow rapidly and form long herbaceous shoots, and the plant is then liable to be killed by the frost. In order to harden the plants and prevent their too rapid growth, the young plants are placed in rows at least four feet apart, with 18 inches or two feet between each plant, on a dry calcareous sloping ground. The chalk on which they grow holds sufficient moisture in summer and yet provides good drainage in winter. At the beginning of September, the young shoots are carefully and evenly cut, with a strong pair of sheep shears, right down to the wood, and the plants soon form a compact stunted hedge about 18 inches high. The old leaves remain on the plant a considerable time, not shrivelling off as do those of lavender. The only manure he gives is cinder ash in abundance, and the spent leaves from the still. The plants are fully exposed to sea air at a considerable elevation about two or three miles from the sea. This Mr. Sawer considers beneficial to their growth, the name Rosemary (*Ros marinus*) almost implying that their native habitat is near the sea.

For purposes of distillation, the young shoots are cut at the end of August or beginning of September, and separated from the wood, *i. e.*, the ends of the main branches, as much as possible. The twigs are then packed tightly into a perforated copper vessel, which is covered with a perforated copper lid, and the whole is lifted into the still by pulley tackle. If the wood is not removed much space is wasted and the oil acquires a turpentiny rankness. If the rosemary is not distilled soon after being gathered, it is liable to heat, and if spread out till the next day, Mr. Sawer believes it would lose much fragrance. Cold water is let into the still until it rises nearly to the level or within an inch of the lid, the head of the still is then luted on and clamped, and the mass left to become saturated with water until the next morning. The fire is then lit and when the water begins to boil the oil distils over. That which comes over during the first twenty-five or thirty minutes is the finest; that which comes over afterward is small in quantity, inferior in quality, and apt to spoil the rest if allowed to distil into it. A worm of tin pipe in a galvanized iron cylinder is used as a condenser. The place chosen, on the dry chalky South Downs, in proximity to the sea, is perhaps the very best that could be selected in this country for a

plant whose native home is on the sunny shores of the Mediterranean.

There appears to be no reason why English oil of rosemary should not be obtained of the greatest purity and of the finest flavor under such favorable conditions, when skill and care are also applied to its production. Mr. Sawer promises details concerning the distillation of lavender at a future date.—*Phar. Jour. and Trans*, Jan. 25, p. 581.

ISOMERIDE OF MONOBROMOCAMPHOR.[1]

By F. Cazeneuve.

Hypobromous acid is prepared by the action of bromine on mercuric oxide suspended in water cooled at 0°, and powdered camphor is agitated briskly with the solution. It forms a reddish-orange liquid, which is washed with cold water, dissolved in alcohol of 93°, agitated with a slight excess of potassium hydroxide to remove bromine, precipitated by the addition of water, washed, dried and finally crystallized from alcohol of 85°, and from chloroform.

The monobromocamphor thus obtained forms ill-defined crystals, which melt at 144–145°, whilst ordinary monobromocamphor melts at 76°. It is insoluble in water, but readily dissolves in alcohol, benzene, ether, and chloroform. A 5·5 per cent. solution in alcohol of 93° has a rotatory power of $[\alpha]_D = +40°$, which is identical with that of the monochlorcamphor obtained by the action of hypochlorous acid (preceding abstract). With water and dilute acids at high temperatures, with ammonia, and in all reactions (*loc. cit.*) the two derivatives behave in a precisely similar manner. They are therefore doubtless similar in constitution, and the bromine has displaced hydrogen in a CH_2 group of the nucleus.

The monochloro- and monobromo-derivatives obtained respectively by the direct action of bromine, or the action of chlorine in presence of alcohol, contain the halogen in the ortho-relation to the carboxyl. It is probable that the isomerides contain the halogen in the para-relation, but they may also be regarded as ethereal salts of a secondary alcohol with the CH.OH group in the nucleus. The latter view is supported by the liberation of hydrochloric or hydrobromic acid by the action of water or dilute sulphuric acid at 150°, and by the production of amines on treatment with ammonia.

[1] *Compt. rend.*, cix, 439–441; *Jour. Chem. Soc*, 1889, p, 1205.

JALAP AND JALAP RESIN.[1]

By F. A. Flückiger.

The resin of jalap is a much-used remedy, not yet supplanted by synthesis, which medicine, apparently, would not willingly be deprived of. But for nearly twenty years the fact has been becoming more and more evident that the tubers of *Ipomœa purga*, the only material used in Europe and America in the preparation of resina jalapæ, yield less of that substance than in former times. In 1842, Guibourt, experienced and careful in such matters, found no less than 17·65 per cent. of the resin, and statements varying between this amount and 10 per cent. were about that time not infrequent, if I read correctly. The authors of "Pharmacographia" have brought together (p. 445) a few statements on the subject from the circle of their friends and acquaintances; the older drug houses would probably be in a position to contribute towards making them more complete. But probably, for the last twenty years, as it appears to me, the statements of 10 per cent. yields, or upwards, have been fewer, and the larger proportion of the jalap has yielded less, frequently only a small percentage of resin.

Whence this phenomenon? The complaint that the drug appeared inferior or consisted of smaller tubers, has by no means been heard during the same time; indeed to my knowledge it has not been proved that the larger and older pieces are richer in resin. Reasons for an actual retrogression in the resin formation in the root organism of the jalap plant are not conceivable, so that one is brought to the presumption that a fraudulent abstraction from the jalap takes place. Of this Dr. Squibb in the latest number of the *Ephemeris* (July, 1889,) presents an indication the importance of which should not be underestimated. He made applications in Hamburg, London and New York to be supplied with the finest jalap in considerable parcels, but obtained only one consignment that yielded more than 7½ per cent. of resin. One house in New York, not more exactly specified by him, sent a representative to the district in Mexico that formerly yielded jalap and authorized him to purchase the root at any price on the spot. Two hundred pounds obtained in this way yielded 16·9 per cent. of resin. A fur-

[1] From the *Journal der Pharmacie*, von Elsass-Lothringen, for November.

ther quantity of some hundreds of pounds, from the neighborhood of Xalapa and Perote, was on its way.

It may therefore be probably assumed that the dealer in Mexico has acquired sufficient chemical knowledge to wash the jalap with alcohol. If it were previously charred by suitable drying at a fire it would not undergo any remarkable change through a short immersion in alcohol; and it may easily be demonstrated that if the root is previously bruised this is never the case.

The jalap plant first reached Europe in 1830, through Schiede, and was successfully cultivated in Cassel, Munich and other places; since that time many botanical gardens have possessed the plant. In July, 1834, Apotheker Widnmann, of Munich, examined a jalap tuber grown in that city, which was so juicy that there remained after drying only 10·9 per cent. This dried substance gave up to absolute alcohol a quantity of resin equal to 2·479 per cent., calculated on the fresh root, or 22·74 per cent. of the dried material. So far as I know a jalap richer in resin was never met with. It is probable that the observer may be credited that he actually had to do with the jalap resin (convolvulin), the more so as he adds that it was pale yellow, easily friable and insoluble in ether.[1] The dried root is described by Widnmann as being remarkably pale; no wonder therefore that the resin should be only yellowish and not brown.

The work of the Munich pharmacist moreover finds confirmation in an investigation carried out at Bonn by Clamor Marquart, of a jalap root, originating from the same consignment, by Schiede, as Widnmann's, and which was grown at Cassel by Wild. The root, when dried, yielded 12 per cent. of a yellow resin, soluble in caustic potash solution and fuming nitric acid, but not in ether, which only took up a minute quantity.

There is no doubt, therefore, that roots from jalap plants grown in Germany in the open air may be remarkably rich in resin; that in Munich over 20 per cent. of resin was produced, and in Cassel only half as much does not affect the matter. It is only now necessary to bring these experiments again prominently into the light in order that agriculturists may be provoked to the cultivation of the jalap plant, which probably would bring greater profit than many

[1] Buchner's *Repertorium für Pharmacie*, vol. liv (1835), p. 222.

more difficult crops. That any specially great difficulties would have to be overcome in the cultivation of the jalap plant is probably scarcely to be feared, since it is stated in the paper already quoted (p. 232), that Schiede's consignment of jalap tubers supported in the winter of 1829–30, on board ship in the Elbe, a temperature of —20° R., and at Munich the plants did better in the cold-house, and afterwards in the open air, than in the hot-house. Even at that time the gardener who had the matter in hand at Cassel recommended the cultivation of jalap in Germany.

Although, however, this may not turn out so simple as might be wished, it may be inferred from the few experiments recalled, that it must be practicable somewhere in Europe, by the cultivation of the jalap plant, to render a service to medicine and to make a good business.

The genera *Convolvulus* and *Ipomœa* are distributed in warm and hot countries especially, to the extent of some five hundred species. Probably all this enormous number of plants contain one or other of the resins jalapin (jalapurgin, convolvulin) or orizabin; possibly also other members of the same homologous series in which these two resins have up to the present stood alone. Accident has determined that medicine-requiring humanity in Mexico has lighted upon these two species of *Ipomœa*, *I. purga* and *I. orizabensis*, rather than upon some other American species.

Neither in Asia are there wanting powerfully drastic species of *Ipomœa*. Possibly the presumed fraudulent deprivation of the Mexican jalap may be successfully combated by means of the still onger used *Ipomœa Turpethum*, but this root appears to me to be ess productive. On the other hand I have long since shown "Pharmacographia," 1st edit., p. 403,) that from the seeds of *Ipomœa hederacea*, Jacquin (*I. Nil*, Roth.; *Pharbitis Nil*, Choisy) over 8 per cent. of resin can be obtained, which is identical with that from *Ipomœa purga*. This resin (jalapurgin or convolvulin) can be removed with the greatest ease by means of alcohol from the seeds, after they have been freed from fat and powdered, and is obtained nearly pure at the first attempt. Instead of the unsightly preparation to which European pharmacopœias give prominence under the name resina jalapæ, the kaladana seeds yield the same substance only slightly colored. This far better looking resin obtained a place in the Pharmacopœia of India as far back as 1868, and

probably it is only the power of habit that stands in the way of its general introduction. Even in England kaladana resin has met with no acceptance in comparison with less easily obtained scammonium, which is there so remarkably favored. Further, the kaladana plant (figured in the *Bot. Mag*, t. 5720; not so well in Bentley and Trimen, "Med. Pl.," 185) has the great advantage over *Ipomœa purga* that it is an annual and extraordinarily widely distributed. Not only is it quite common in India (Dymock, "Mat. Med. W. I.," 1885, 561), but it flourishes everywhere in warm and hot countries. If, therefore, there were any demand established, presumably there would not be the slightest difficulty in harvesting suitable quantities of the seed. The 14 per cent. of fat that would have first to be separated would remunerate for a portion of the work.

It remains a question whether the presumption of an abundant yield of seed would be realized in an agricultural experiment with this *Ipomœa*. If this were actually the case it would seem to be folly that the English government should take so much trouble to acclimatize the Mexican jalap plant in Jamaica and India. From the standpoint of the resin it would be much better to apply this care to the kaladana plant. Japan also possesses in *Ipomœa triloba*, or *Pharbitis triloba*, a species from the seed of which the same resin as from jalap was obtained last year in the laboratory of my colleague and friend, Shimoyama, Director of the Pharmacological Institute of the University of Tokio.—*Phar. Jour. and Trans.*, Jan. 11, p. 546.

CHEMICALLY PURE NARCEINE.

By E. Merck.

In a note, entitled "Narceine and its Salts,"[1] D. B. Dott refers to the contributions to the knowledge of narceine that have appeared during the last three years. As the results to some extent of my work are spoken of in terms of unfavorable criticism, I feel called upon to bring forward the following facts:

Chemically pure narceine was not hitherto obtainable in commerce. I have, on the contrary, pointed out that the samples of English narceine examined by me during a series of years did not consist of the free base, but were basic salts—hydrochlorides, acetates and

[1] Read at the Newcastle meeting of the British Pharmaceutical Conference.

sulphates--and that in addition they contained other substances in varying quantities.

Since a theory has value only when it is supported by experimentally proved facts, I have not, in the absence of such experiments, spoken more definitely upon the chemical nature of these samples of narceine containing acid, but in print have only stated that they are "probably to be considered as basic salts."

Dott appears to have overlooked this, since he ascribes to me that I look upon these substances as mixtures of free base and normal salts. However, I willingly concede that the expression selected by me in one place might furnish opportunity for an error in the sense indicated, though my intention was to mention in that place the results of an analysis showing the presence of hydrochloric acid in narceine, simply because that very interesting fact was thus brought under notice in the most drastic manner.

As to the collision with Wright's investigations upon narceine hydrochloride, I may remark that my object was to illustrate the difficulties attending the attempt to remove the whole of the acid from commercial narceine. With that object I selected a sample of narceine containing hydrochloric acid, and in that respect corresponding to the majority of the preparations tested, but the same results hold good for narceine containing either acetic acid or sulphuric acid.

The fact then observed was that narceine crystallized out from 50 per cent. alcohol, and even in the presence of free ammonia, still contained hydrochloric acid, and that fact was at any rate so surprising and so new that a closer investigation appeared to be justified.

It can easily be ascertained by experiment that, contrary to Dott's statement, narceine containing hydrochloric acid cannot be perfectly freed from the acid by recrystallization.

In the case before us I cannot agree with the views of Dott upon the limited importance of the melting point as a means of establishing the purity of certain alkaloids, for it is only when narceine is absolutely free from acid and other foreign admixtures that it melts above 170° C.

In respect to the use of the alkaloid it was expressly stated that "good commercial narceine might fully suffice for therapeutic use;" but the chemist must be more thorough-going in his requirements

as to the purity of narceine, and the object of my communication was to show that.

There has also come under my notice the communication from P. C. Plugge,[2] which I am equally unable to leave unanswered.

Herr Plugge appears to be annoyed because I have left unmentioned his work upon narceine, the chief point of which is the not very novel classification[3] of the opium alkaloids into strong and weak bases. But there was no ground for me to quote Plugge's results, as I occupied myself with the preparation of chemically pure narceine, and in doing so could not mention all the communications that have appeared upon that alkaloid, but only those standing in direct connection with my subject.

However, it is by no means the case that I have anywhere asserted in opposition to previous authors that narceine is not a weak base. The purport of the passage which Plugge quotes from my communication is to some extent distorted through the absence of subsequent passages and an opinion is attributed to me which I never held and have never expressed. What I wished to bring out was that chemically pure narceine, contrary to previous statements, possesses a *weak alkaline reaction*, and that it manifests quite a *peculiar affinity for acids*, on which account it holds an exceptional position among the opium alkaloids.

The assumption by Plugge that narceine and acetic acid do not combine chemically is a false one; presumably he could not have worked with chemically pure narceine. In a water solution certainly decomposition does take place; but if chemically pure narceine be moistened with acetic acid, allowed to dry, and the residue powdered, the odorless powder so obtained does not either by weeks of exposure to the air or by four hours' heating to 70° C. lose the acetic acid to which its strong acid reaction is due, a certain proof that this is chemically combined.

Because this fact cannot be brought into record with one of Plugge's conclusions, he contents himself with describing this experiment as "*somewhat strange*, and one to which no value is to be ascribed." I feel myself compelled to declare in this place, once for all, that in future I shall not be induced to take seriously into

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[2] See AMER. JOUR. PHAR., January, 1890, p. 34.

[3] See Hesse's classical papers, *Annalen*, cliii, Suppl., viii, etc.

consideration any statements as to the chemical nature of narceine, if they are not based upon experiments with chemically pure narceine.

The extremely contradictory results which I have myself obtained through a series of years with the commercial narceine formerly accepted as pure, was the occasion of my taking part in the settlement of the chemical properties of chemically pure narceine, and in this sense I hoped to interest chemists by my small communication.

In conclusion, I would take this opportunity to mention that I have succeeded in obtaining two of the rarest opium alkaloids, namely, *laudanine* and *protopine*. I found their properties to correspond essentially with the statements made by Hesse at the time he discovered them. Laudanine, especially, on account of its analogy to morphine, appears to be of great interest. It is soluble in caustic soda solution and can be converted by methylation into a new base, which chemically resembles codeine.—*Phar. Jour. and Trans.*, Dec. 21, 1889, p. 482.

SOME INCOMPATIBILITIES OF ANTIPYRIN.

If liquid extract of cinchona be added to a solution of antipyrin in distilled water, a dense reddish brown precipitate is formed, which contains tannic acid and antipyrin. The greater part of this precipitate dissolves on the addition of dilute sulphuric acid, the insoluble portion being probably the coloring matter of the bark, for if a solution of tannic acid be used instead of the liquid extract of cinchona as a precipitating agent, a precipitate forms, which entirely and easily dissolves on the addition of the dilute sulphuric acid. It follows, therefore, that decoctions, infusions, and tinctures containing tannic acid should act in the same manner. The effect, however, produced by these preparations is very small compared with the liquid extract of cinchona. Antipyrin is not precipitated by solutions of the alkaloids quinine, cinchonine, or cinchonidine. Therefore, it can be prescribed in a mixture containing sulphate of quinine and dilute sulphuric acid. When strong solutions of chloral hydrate and antipyrin are mixed, a white precipitate is formed, which soon becomes resolved into globules of oily-looking liquid, which sink to the bottom in a distinct layer. This layer in the course of some hours changes into a crystalline

mass, from which the clear upper liquid can be drained off. These crystals are soluble in water, but considerably less so than either antipyrin or chloral hydrate. They have a distinct taste of chloral without its pungency, and they are not so bitter as antipyrin. This precipitation does not occur in dilute solutions, and it is possible to mix a solution containing sixty grains of antipyrin to the fluid ounce with one containing the same proportion of chloral hydrate without any precipitate being immediately formed, although in a few hours small crystals begin to appear. A solution containing fifteen grains each of antipyrin and chloral hydrate to the fluid ounce appears to be a permanent one, for at the end of a week there is no appearance of crystalline matter. Clinical experience alone can determine whether mixtures of these two bodies possess any therapeutic properties different from those of the consituents. In prescribing them together, it is to be borne in mind that the solutions must be dilute —*British Medical Journal*, November 16, 1889.

CHLORALAMID AS A HYPNOTIC.[1]

By W. Hale White, M.D., F.R.C.P.,

Senior Assistant Physician to, and Lecturer on Materia Medica and Therapeutics at, Guy's Hospital.

In his exhaustive account[2] of many of the new hypnotics, Prof. Leech says of chloralamid that the observations upon it are so far few in number. I have recently given it to twenty patients suffering from various illnesses, in all of whom insomnia was a troublesome symptom. Brief notes are appended. It will be seen that the drug produced comfortable sleep in all the patients except two; one of these was suffering from delirium connected with cerebral hemorrhage, and the other was admitted with rheumatic fever complicated by delirium tremens and salicylic poisoning. Both these patients died shortly after admission. It is noteworthy that some of the other patients were suffering from extremely painful diseases, and yet chloralamid produced sleep; thus a woman who had a thoracic aneurysm preferred it to morphine, and another patient who had carcinoma of the stomach also slept better with chloralamid than with morphine. The patient with carcinoma of the liver suffered intense pain, yet she dozed comfortably after chloralamid.

[1] Abstract from a paper published in *British Medical Journal*.

[2] *Journal*, November 2, 1889, p. 969.

The man suffering from cerebral softening who was quieted by the drug is also a striking case. Probably the house physicians, sisters, and nurses are the best judges of hypnotics, as they see the patients frequently during the night. They all tell me that those who take chloralamid sleep well and comfortably after it, and the sisters of the three wards in which I have used it tell me that the patients sleep better after chloralamid than after any of the hypnotics which have been introduced during the last few years. My own experience, and what the patients themselves tell me certainly agree with this. In none of the twenty patients to whom I have given it—and many of them have taken several doses—have any effects followed that can be looked upon as contra-indications to its use. Never have I observed any depressing results, nor has headache followed its use. The time which elapses between its administration and the commencement of sleep varies between a quarter of an hour and two or three hours. If it is given in the evening, when once asleep the patient usually sleeps quietly till morning. Some writers have stated that occasionally after a dose in the evening the patient does not go to sleep till the next morning, and that he remains asleep all the day. This was so with one of my patients; but it must be remembered that, as the drug is feebly soluble in water—20 grains take five hours to dissolve in 2 ounces of water—it is often given as a powder with some milk. It was administered in this way to my patient who slept the next day, and I should think that some of these cases of delayed action were due to delayed absorption. Now I always prescribe it with spirit; 20 grains will dissolve in 1 drachm of rectified spirit in fifteen minutes, and water may be added to this solution without reprecipitating the drug. A good way of giving it is to tell the patient to dissolve it in a little brandy, add water to his liking, and drink it shortly before going to bed. If given in milk, not only is it insoluble, but it is difficult to swallow, for it sticks to the sides and bottom of the glass. The taste is slightly bitter, but by no means disagreeable. It should never be prescribed with alkalies, for they decompose it, nor should hot water be mixed with it, for it decomposes at 148° F. For an adult, 20 to 60 grains—the exact amount depending upon the cause of the insomnia—is the dose; usually 30 grains will suffice. It has the advantage over sulphonal that it is only half the price, and it has the great advantage over paraldehyde that it has no nasty smell or taste, nor is it difficult to dissolve.

It would seem that in chloralamid we have a safe hypnotic, which hardly ever has any depressing effects, which does not produce indigestion, and very rarely gives rise to any unpleasant results. We do not, of course, yet know what harm may result from its prolonged use. References to those authors who have studied the chemistry and physiological action of the drug will be found recorded by Leech, Paterson,[3] and in a leading article in the *Therapeutic Gazette*, for September, 1889. Rabaw[4] considers 45 grains of chloralamid to be equivalent to 30 grains of chloral. Chloralamid has been used successfully as an enema by Peiper.[5]

SULPHITES.[1]

By P. J. Hartog.

Normal potassium sulphite is obtained by dissolving 100 grams of potassium hydroxide in 200 cc. of water free from oxygen, saturating with sulphurous anhydride, and then adding a further quantity of 100 grams of potassium hydroxide dissolved in as little water as possible. The solution is evaporated in a vacuum, and the crystals are drained on cotton wool in an atmosphere of nitrogen. Since the salt is less soluble in hot water than in cold, it is advisable to keep the funnel warm when collecting the crystals. The sulphite is thus obtained in small, anhydrous, hexagonal prisms with basal modifications. It is deliquescent, but oxidizes less rapidly than its solution; heat of dissolution — 1·75 Cal.

Normal sodium sulphite is obtained in the same way in anhydrous crystals of the same form, always mixed, however, with a certain proportion of the heptahydrated salt; heat of dissolution + 2·71.

Sodium potassium sulphite, $NaKSO_3$, is obtained in crystals, which resemble those of the simple anhydrous salts, by adding potassium hydroxide to sodium anhydrosulphite. When the solution of the double sulphite has been partially oxidized, and is then gradually concentrated, the crystals which separate are first hepta-

[3] *Lancet*, October 26, 1889

[4] *Centralblatt für Nervenheilkunde*, August 1, 1889.

[5] *Deutsche Med. Woch.*, August 8, 1889.

[1] *Compt. rend.*, cix; reprinted from *Jour. Chem. Soc.*, Dec., 1889, p. 1106. Compare also Amer. Jour. Phar., 1889, p. 584.

hydrated sodium sulphite, then the double sulphite, and lastly potassium sulphate; hence it would seem that at first the potassium sulphite alone undergoes oxidation. Heat of dissolution of the double salt — 1·19 Cal.; heat of dissolution of hydrated sodium sulphite in a solution of potassium sulphite — 11·01 Cal.; heat of formation of the double sulphite + 3·76 Cal.

When a solution containing potassium and ammonium sulphites in equivalent proportions is concentrated, the first crystals consist solely of potassium anhydrosulphite. These are followed by monohydrated ammonium sulphite, in which part of the base is replaced by potassium. In presence of a large excess of ammonia, hexagonal prisms of the composition $1·14(NH_4)_2O$, $0·86K_2O,2SO_2$ are obtained, together with acicular crystals of the composition $K_2O,10(NH_4)_2O,-11SO_2+11H_2O$. This salt dissociates at the ordinary temperature, and if it is enclosed in a sealed tube containing nitrogen, ammonium sulphite condenses in the upper part of the tube.

No sodium ammonium sulphite could be obtained.

The double sulphite, $2Na_2O,K_2O,4SO_2+9H_2O$, is obtained by saturating two molecular proportions of sodium carbonate with sulphurous anhydride, adding one molecular proportion of potassium carbonate and concentrating. It separates in rounded crystals which cannot be dehydrated without decomposition. At 90° the salt undergoes no change, and at 100–110° it loses water and sulphurous anhydride. Heat of dissolution, — 30·39 Cal.; heat developed by the action of potassium oxide on two molecular proportions of sodium anhydrosulphite, + 16·81 Cal.; heat of formation of the double salt, + 25·88 Cal.

The salt $2Na_2O,(NH_4)_2O,4SO_2+9H_2O$ always separates from mixtures of sodium and ammonium sulphites. It can readily be obtained in a crystalline form by passing ammonia gas into a saturated solution of sodium hydrogen sulphite. Its heat of dissolution is — 30·72 Cal. The action of ammonia on sodium anhydrosulphite develops + 15·68 Cal.; the formation of the solid salt from $2Na_2SO_3$ sol + $(NH_4)_2S_2O_5$ sol + $9H_2O$ sol, therefore, develops + 19·62 Cal.

An analogous potassium compound also exists.

The reaction $2Na_2S_2O_5+(NH_4)_2O$ develops + 15·68 Cal. if the solution of the sodium salt is freshly prepared, but only 12·94 Cal. if the solution has been kept in an atmosphere of nitrogen for three months. The author distinguishes the two modifications as *α*- and

β-, and it is evident that the conversion of the former into the latter develops + 2·74 Cal. The action of ammonia on the double salt just described develops + 23·52 Cal. if it has been prepared from anhydrosulphite α; + 23·87 Cal., if from anhydrosulphite β; and + 23·87 Cal. if from Marignac's salt.

Berthelot has shown (*Ann. Chim. Phys.* [6], iii, 242), that a solution which contains 2 mols. of sulphurous anhydride and 1 mol. of potassium oxide alters spontaneously with development of + 2·6 Cal., 2 mols. of potassium hydrogen sulphite forming 1 mol. of the anhydrosulphite with elimination of water. According to de Forcrand, no similar change occurs with the sodium salt, but the fact that a similar thermal disturbance is observed seems to point to the opposite conclusion.

The action of two successive molecules of ammonium oxide on the two molecules of potassium anhydrosulphite develops + 25·05 Cal. and 23·32 Cal., respectively, the corresponding values for the α-sodium salt being 26·16 Cal. and 23·52 Cal., and for the β-salt 23·42 Cal. and 23·87 Cal., respectively. The fact that the heat of neutralization of the fourth acid function by ammonia is less than the heat of neutralization of the first three, indicates that the anhydrosulphites contain four equivalents of metal in the molecule. With sodium or potassium hydroxide in place of ammonia, however, the four heats of neutralization are identical. Nevertheless the author considers that this view is supported by the existence of double sulphites, such as $3MgO,Am_2O,4SO_2 + 18H_2O$ and $3CdO,Na_2O,4SO_2$.

REACTION BETWEEN SOLUTIONS OF FERRIC CHLORIDE AND POTASSIUM IODIDE.

By D. J. Carnegie.

The decomposition of acid solutions of potassium iodide appears to be a function of time and temperature; it can be arrested by surrounding them with an inert atmosphere, except when the solutions are strong and the temperature high.

The author has made numerous experiments with solutions of potassium iodide and ferric chloride of known strength, and although many of his results indicate that a ratio of 1 mol. of KI to 1 atom

[1] *Chem. News*, lx, 87–90; *Jour. Chem. Soc.*, Dec., 1889, 1113.

of Fe is sufficient to effect the decomposition, yet, by taking into consideration the conditions of the experiment and the various secondary reactions, he considers that the equation: — $FeCl_3 + 3KI = FeI_2 + I + 3KCl$, is more probably the correct representation of the reaction than the equation: — $FeCl_3 + KI = FeCl_2 + KCl + I$. For the volumetric estimation of ferric iron, the ratio Fe to liberated iodine is alone considered, and is the same in both equations. The distillation method is considered preferable to the digestion process. The solution of potassium iodide is placed in the flask, saturated with carbonic anhydride, the ferric solution added, and distillation proceeded with as rapidly as possible; the volatilized iodine being caught in potassium iodide solution saturated with carbonic anhydride (to neutralize any hydroxide present). For the distillation, it is convenient to have the delivery-tube ground into the neck of the flask, so as to permit of speedy detachment; for the delivery of the thiosulphate, the author employs an improvised "stillimeter," on the principle of Mariotte's bottle. The "after-bluing" of the starch, sometimes observed in the titration, is considered as due to the sodium iodide formed during the titration, reinforcing the small residue of potassium iodide, which, in its turn, reacts on the residual ferric chloride, establishing a fresh equilibrium, until some more thiosulphate is added, when the same reactions take place again, until all the ferric chloride is destroyed.

It is pointed out that commercial potassium iodide nearly invariably contains sufficient free potash to vitiate in some degree all iodometric estimations effected with its aid. The potassium iodide solution used to absorb the iodine liberated in such estimations should be supersaturated with carbonic anhydride previous to use.

UNOFFICIAL FORMULARY ADDENDUM.[1]

ACIDUM HYDROCYANICUM (Scheele)—*Hydrocyanic Acid* (Scheele).

Take of—

Ferrocyanide of potassium,	2¼ oz.
Sulphuric acid,	1 fluid oz.
Distilled water, 24 fl. oz., or a sufficient quantity.	

Dissolve the ferrocyanide of potassium in 10 ounces of the water, then add the sulphuric acid, previously diluted with 4 ounces of the water and cooled. Put the solution into a flask, to which are attached a condenser and a receiver

[1] *Year-book of Pharmacy*, 1889, published by the British Pharmaceutical Conference.

arranged for distillation, and having previously put 1 ounce of distilled water into the receiver, and provided efficient means for keeping the condenser and receiver cold, cautiously apply heat to the flask, until by slow distillation the liquid in the receiver is increased to 10 fluid ounces. Add to the product as much water as may be sufficient to bring the acid to the required strength.

Characters and Tests. — A colorless liquid. Specific gravity, 0·994. A fluid drachm of it leaves on evaporation no fixed residue. It gives no precipitate with chloride of barium, but with nitrate of silver it yields a white precipitate, entirely soluble in boiling concentrated nitric acid. Its strength, as determined by the process of the British Pharmacopœia by means of volumetric solution of nitrate of silver, corresponds to 4 per cent. of hydrocyanic acid.

Dose.—1 to 4 minims.

ACIDUM HYPOPHOSPHOROSUM—*Hypophosphorous Acid.*

Take of—

Hypophosphite of barium . . . . . 8 oz.
(Containing not less than 95 per cent.
$Ba_2(PH^2O^2)H^2O$).

Diluted sulphuric acid } of each a sufficient quantity.
Distilled water }

Dissolve the hypophosphite of barium in 36 fluid ounces of hot distilled water. Add slowly to the solution 17 fluid ounces of diluted sulphuric acid, after which continue the addition, drop by drop, until no further turbidity is produced. Set aside in a warm place, and pass the clear liquid through a filter. Wash the precipitate by decantation with successive portions of hot distilled water, until the washings have no longer an acid reaction. Filter, unite the filtrates, and evaporate the liquid on a water-bath to the prescribed density. The product will weigh about 11½ ounces.

Characters and Tests.—Colorless. Specific gravity, 1·1367. Its strength, as determined by volumetric solution of soda, corresponds to 30 per cent. of hypophosphorous acid. Its aqueous solution is not precipitated by diluted sulphuric acid, nor by an excess of ammonia, nor by oxalate of ammonia after neutralization, and gives not more than a faint opalescence with chloride of barium. If solution of ammonio-sulphate of magnesium be added after an excess of ammonia, no precipitate is produced. Chloride of calcium added to a neutralized solution yields no precipitate.

Dose.—2 to 5 minims.

CHLOROFORMUM ACONITI—*Chloroform of Aconite.*

Take of—

Aconite root, ... 20 oz.
Strong solution of ammonia, ... 1½ fl. oz.
Distilled water, ... 1 pint.
Chloroform, a sufficient quantity.

Bruise the aconite root, and moisten thoroughly with the strong solution of ammonia and distilled water previously mixed. Macerate for four hours, dry carefully, and reduce to No. 40 powder. Pack tightly in a percolator provided

with a tap and closely-fitting cover. Macerate for twenty-four hours with 20 fluid ounces of chloroform, then pour on successive quantities of chloroform, percolating slowly until 30 fluid ounces are obtained.

CHLOROFORMUM BELLADONNÆ—*Chloroform of Belladonna.*

Prepared as chloroform of aconite (*q.v.*), substituting belladonna root for aconite.

CHLOROFORMUM CAMPHORATUM—*Camphorated Chloroform.*

Take of—

Camphor,	2 oz.
Chloroform,	1 fl. oz.

Dissolve.

ELIXIR SENNÆ—*Elixir of Senna.*

Take of—

Alexandrian senna,	1 pound.
Refined sugar, in coarse powder,	12 oz.
Rectified spirit, Distilled water,	of each a sufficient quantity.

Mix 4 fluid ounces of rectified spirit with 12 fluid ounces of water, and with it moisten evenly the senna. Pack tightly in a closed vessel, and macerate for three days. Express forcibly, and pour the product on the sugar. Break up the marc, and add to it sufficient of the same menstruum to furnish in all 16 fluid ounces of product. Express again after twenty-four hours' maceration, add the liquor to the previously obtained product and the sugar, heat in a closed vessel by means of a water-bath to 200° F., and maintain at that temperature for ten minutes. When cold strain and add, after mixing—

Chloroform,	24 minims.
Oil of coriander,	2½ "
Tincture of capsicum,	½ fl. drm.
Rectified spirit,	3 "

Agitate thoroughly, and if necessary, add proof spirit to make the product measure 24 fluid ounces.

Dose.—1 to 3 fluid drachms.

EXTRACTUM HÆMATOXYLI LIQUIDUM—*Liquid Extract of Logwood.*

Take of—

Unfermented logwood in No. 16 powder,	20 oz.
Distilled water,	6 pints.

Boil the logwood with two pints of water in a covered copper or enamelled pan for half an hour, and strain. Add two pints of water, boil for another half-hour, and again strain. Repeat the process for a third time, and having mixed the strained liquors, evaporate over a water-bath (or preferably *in vacuo*) until the product measures 1 pint. Set aside for seven days, and then decant the clear liquor by means of a siphon from any sediment that may have been deposited.

Dose.—½ to 2 fluid drachms.

SYRUPUS CALCII HYPOPHOSPHITIS—*Syrup of Hypophosphite of Calcium.*

Take of—

Hypophosphite of calcium, ... 160 grains.
Distilled water, ... 9 fluid oz.

Dissolve and filter. To the filtered solution add—

Refined sugar, ... 1 pound.

Dissolve with the aid of a little heat, strain, and add after cooling,

Hypophosphorous acid, ... 20 minims.

Distilled water, sufficient to produce 1 pint.

Mix. Each fluid drachm contains 1 grain of hypophosphite of calcium.

Dose.—1 to 4 fluid drachms.

SYRUPUS SODII HYPOPHOSPHITIS—*Syrup of Hypophosphite of Sodium.*

Take of—

Hypophosphite of sodium, ... 160 grains.
Distilled water, ... 3 fluid drms.

Dissolve, filter, and wash the filter with distilled water, 1 fluid drachm. To the filtered solution add—

Syrup, sufficient to produce, ... 1 pint.

Mix. Each fluid drachm contains 1 grain of hypophosphite of sodium.

Dose.—1 to 4 fluid drachms.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 18, 1890.

The meeting was called to order by asking Mr. Alonzo Robbins to preside. In the absence of the Actuary, Dr. C. B. Lowe was appointed Secretary *pro tem*. The minutes were approved as read.

The attention of the meeting was called to the shampoo liquid in Lassar's treatment for baldness, as published in the *Scientific American*, of February 15, 1890, *viz.*, Hydrarg. bichlor. corr., gr. x; Glycerini, Spir. rectif. āā, ℥ii; Aquæ destill., ℥v.

Mr. Beringer thought the amount of corrosive sublimate in this recipe was too large, and that an error had been made in translating from the French.[1]

The recipe for the embrocation in this treatment for baldness calls for acid salicyl., gr. xxx; Tinct. benzoini, ℥i; Olei ped. taur. ad ℥iii. It was thought that neatsfoot oil would not prove to be a very agreeable emollient to a bald head.

Prof. Trimble read a paper, prepared by Mr. S. J. Hinsdale, of Fayetteville, N. C., on the *Estimation of Tannin;* at the same time his assistant, Mr. Peacock, carried out the experiments according to Mr. Hinsdale's method.

Prof. Trimble said that there had been many methods proposed for estimating *tannin*, the great majority of which were failures, the best being its precipitation by gelatin in the presence of a little alum; he seemed to think that Mr.

[1] The same formulas have been published in *Provincial Medical Journal* Dec. 2, 1889, and more recently in other medical journals.—Editor AMER. JOUR. PHAR.

Hinsdale's method would be of special value in analyzing barks for tanneries. Mr. Beringer asked whether the process had been tried with other substances containing tannin; Prof. Trimble said that it had worked equally well with two different kinds of oak bark, and with catechu; and that different amounts of tannin had been detected by it within 0·5 per cent. of the actual quantity present.

Some discussion took place concerning parts by weight in the Pharmacopœia; Prof. Maisch stating that it was not universally condemned in all parts of the country, some being in favor of it.

Mr. Boring stated that the advantage in the system lay in the check which was always at hand, everything being tared the weight of the percolate could be told in an instant.

Mr. McIntyre said that the greatest disadvantage lay in the fact that physicians did not prescribe in that way.

Prof. Maisch stated that some ten years ago he made known some simple rules to enable physicians to prescribe liquids by weight, as is done in Europe, but that most of the physicians had done nothing towards introducing the system.

Mr. Robert England stated that the metric system was unpopular with physicians, and that it seemed impossible to get them to use it.

Prof. Maisch stated that the reason for the use of the metric system in the formulas of the fluid extracts of the U. S. P. was on account of the intimate relationship which existed between the weights and measures, and that there was also a close relationship between the weights and measures of the British Pharmacopœia, but such was not the case with those of the U. S. Pharmacopœia.

It was suggested by Mr. McIntyre that the next meeting be held in Prof. Maisch's lecture-room, so as to give the members present an opportunity to inspect the botanical models lately imported by him from Europe.

Prof. Maisch presented a specimen of *otto of rose*, claimed to have been smuggled by sailors, and hawked about the streets of New York; it consisted of petrolatum flavored with French oil of rose-geranium, and was evidently a fraudulent imitation made in this country.

Mr. Bullock presented to the meeting some of the so-called "*Trenton Coffee*," which consisted of very good imitations of the grains of coffee, made of clay, and flavored by being dipped in an infusion of coffee; also some *Bismuthic acid*, and some *pentoxide of bismuth*.

Mr. Boring complained of the alcoholic strength of some of the preparations of the Pharmacopœia as being in his opinion too great, a menstruum of less strength would exhaust the drug as well, and would also promote temperance.

Mr. Robbins stated that the menstruums as ordered were intended to be the best for exhausting the drugs, and that the chief object of the Pharmacopœia was to secure uniformity in the composition of medicines.

On motion adjourned.

C. B. LOWE,
Secretary pro tem.

Inhalations of menthol, dissolved in four parts of olive oil, were observed by Dr. Jores (*Memorabilien*) to give immediate relief in severe cases of asthma. The patients inhale the atomized solution during the paroxysm.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Hand-book of Materia Medica, Pharmacy and Therapeutics, including the physiological action of drugs, the special therapeutics of disease, official and extemporaneous pharmacy and minute directions for prescription writing. By S. O. L. Potter, M.D., Professor of the Theory and Practice of Medicine in the Cooper Medical College of San Francisco, etc. Second edition, revised and enlarged. Philadelphia, P. Blakiston, Son & Co. 1890. 8vo. Pp. 766. Price, cloth, $4; leather, $5.

The first edition of this work has been noticed at some length in this JOURNAL, April, 1887, p. 222. The author states that in the second edition all known errors have been corrected, many articles have been entirely re-written, much new matter has been incorporated and the original text has received a thorough revision. In looking over the pages and comparing the text with that of the first edition, it becomes evident that much care has been bestowed upon every part that is of special interest to the physician; but the chemical and pharmaceutical pages have not received the same attention. Most of the errors which we noticed in the first edition, to some of which we referred in the previous review, remain uncorrected, or like that relating to the sources of salicin, have been insufficiently altered. The general correctness of all that belongs to the therapeutical uses and the physiological action of medicines will render the book of as great practical value to the physician as the preceding edition has been, and the larger size of the page and the clear type will facilitate its use as a work of reference.

Spinal Concussion—surgically considered as a cause of spinal injury, and neurologically restricted to a certain symptom group, for which is suggested the designation Erichsen's Disease, as one form of the traumatic neuroses. By S. V. Clevenger, M.D., Consulting Physician in the Reese and Alexian Hospitals, etc. With 30 wood engravings. Philadelphia and London: F. A. Davis, publisher, 1890. 8vo. Pp. 338. Price, $2 50.

Physicians and lawyers will recognize this work as one of especial importance to their respective professions, it treating of a subject which for more than twenty years has occasioned bitter contention in law-courts, and the voluminous literature of which has been carefully reviewed by the author and supplemented by his own observations.

The Chapters are: Historical Introduction; Erichsen on Spinal Concussion; Page on Injuries of the Spine and Spinal Cord; Recent Discussions of Spinal Concussion; Oppenheim on Traumatic Neuroses; Illustrative Cases of Spinal Disease; Traumatic Insanity; The Spinal Column; Symptoms; Diagnosis; Electro-diagnosis; Differential Diagnosis; Pathology; Treatment; Medico-legal Considerations. Some of the special features consist in a description of modern methods of diagnosis by electricity, a discussion of the controversy concerning hysteria, and the author's original pathological view that the lesion is one involving the spinal sympathetic nervous system. In this latter respect entirely new ground is taken, and the diversity of opinion concerning the functional and organic nature of the disease is afforded a basis for reconciliation.

The following *Proceedings of State Pharmaceutical Associations* have been received:

Alabama.—Eighth Annual Meeting. Pp. 31. See last volume, p. 376.

Massachusetts.—Eighth Annual Meeting. Pp. 145. See last volume, p. 537.

North Carolina—Tenth Annual Meeting Pp. 59. See last volume, p. 538.

A Popular Treatise on the Extent and Character of Food Adulterations. By Alex. J. Wedderburn, special agent. Washington. 1890. Pp. 61.

This is Bulletin No. 25, Division of Chemistry, published by authority of the Secretary of Agriculture.

Expe ental Farms. Reports for 1888. Ottawa, 1889. Pp. 142.

A report made to the Minister of Agriculture for Canada by the Director, Prof. Wm. Saunders, and including the reports of the Chemist, Entomologist, Botanist and other officers.

Fourth Annual Report of the Massachusetts Board of Pharmacy, for the year 1889. Boston. Pp. 7.

During the past year the Board examined 276 candidates, of which number 141 were rejected.

Séance Solennelle de Rentrée et Distribution des Prix de l'École Supérieure de Pharmacie de Paris, le 9 Novembre, 1889. Pp. 19.

Commencement and distribution of prizes at the Paris Superior School of Pharmacy.

Proceedings and Papers of the State Sanitary Convention, held at Lewisburg, Union County, Pa. 8vo. Pp. 120.

Proceedings of the National Conference of State Boards of Health, held at Cincinnati, O., May 4, 1888. Harrisburg. 1889. Pp. 53.

Do the Sanitary Interests of the United States demand the annexation of Cuba? By Benjamin Lee, A.M., M.D., etc. Pp. 8.

The last pamphlet is a reprint from the transactions of the American Public Health Association. For it and the two preceding pamphlets we are indebted to Dr. Benj. Lee, the Secretary of the Pennsylvania State Board of Health.

Diálisis Química. Aplicaciones del Sulfato de Cal. Por Alfonso L. Herrera, Alumno de la Escuela Nacional de Medicina. Mexico. 1889. Pp. 37.

Chemical Dialysis. Applications of Calcium Sulphate.

The author has made a study of the process of dialysis and of the application of various chemicals, having much affinity for water, for the concentration of liquids without evaporation. For the latter purpose anhydrous sulphate of calcium was found to be well adapted. After the requisite quantity of plaster Paris has been added, the mixture is well agitated for fifteen or twenty minutes, when the hydrated salt is deposited as a crystalline powder, from which most of the liquid can be readily poured off, the small quantity retained by the powder being recovered by forcible expression or by centrifugal force. A little calcium sulphate remaining dissolved in the aqueous filtrate, is either precipitated by alcohol, or the calcium is removed by sodium carbonate. The author makes also suggestions for the use of this method in the preparation of various organic compounds, of galenical preparations, and in analytical investigations.

Vergleichende Microscopisch-Pharmacognostische Untersuchungen einiger Officinellen Blätter mit Berücksichtigung ihrer Verwechselungen und Verfälschungen. Von Bruno Jürgens. Dorpat. 1889. Pp. 62.

Comparative Microscopic-Pharmacognostic Examinations of some officinal leaves with regard to their adulterations.

An inaugural dissertation on a subject of much interest and importance. The results cannot be sufficiently condensed for a brief review.

We take pleasure in acknowledging the receipt of a number of reprints from various journals of valuable papers by Messrs. Bertram & Gildemeister, Mr. H. Bonnewyn, Dr. J. E. De Vrij, Dr. O. Hesse and Mr. Ludwig Reuter.

The Agricultural Grasses and Forage Plants of the United States, and such foreign kinds as have been introduced. By Dr. Geo. Vasey, Botanist. With an appendix on the chemical composition of grasses, by Clifford Richardson, and a glossary of terms used in describing grasses. A new, revised and enlarged edition, with 114 plates, published by authority of the Secretary of Agriculture. Washington: 1889. 8vo. Pp. 148.

A very interesting publication by the Department of Agriculture, valuable alike to the agriculturist and to the botanist, containing, in addition to the plates, descriptions of the plants, and an account of their distribution, culture, value as fodder, etc. The portion written by Mr. Richardson gives, in tabular form, the results of 136 analyses of different grasses, calculated for the dry substance and also for the fresh substance or for hay, with an average amount of water equalling 14·30 per cent.

Bericht der Wetterauischen Gesellschaft für die gesammte Naturkunde zu Hanau, 1887–1889, erstattet von dem Direktor derselben Fr. Becker, Realschul-Direktor. Hanau. 1889. Pp. 110.

Report of the Wetteravian Society for the Natural Sciences.

Among the scientific papers are essays on butterflies, plants, diamond, fossil shells of the genus Acme, acoustic researches and geological investigations.

OBITUARY.

William J. McConn, Ph.G., class 1884, died of consumption at Trenton, N. J., where he was in business, December 17, 1889. He was born in Philadelphia, August 13, 1864.

Walter T. Baker, Ph.G., class 1876, died of pneumonia January 14, 1890, aged 45 years; he was in business at Nineteenth and Oxford Streets, Philadelphia.

Benedict Nicholas Rapp, Ph.G., class 1883, of Trenton, N. J., conducted a pharmacy at Twenty-eighth and Poplar Streets, Philadelphia, where he died January 25th.

Cornelius W. Stryker, Ph.G., class 1882, was a member of the firm of Stryker & Ogden, who succeeded Prof. Remington in business; he died in this city, February 10th, aged 30 years.

William P. Burnett, a senior student of the class 1889–90, died in Camden, N. J., February 20th, aged 20 years.

Edgar H. Naudain, Ph.G., class 1885, was born in Chester County, Pa., June 3, 1865, and died of consumption near Middletown, Del., August 2, 1889. He learned the drug business in Wilmington, Del., and studied at the Philadelphia College of Pharmacy, presenting a graduation thesis on Pinckneya pubens, an abstract of which was published in this journal 1885, p. 161. Afterward he conducted a pharmacy in Philadelphia at the corner of Fifth and Poplar streets, until failing health compelled him to relinquish business.